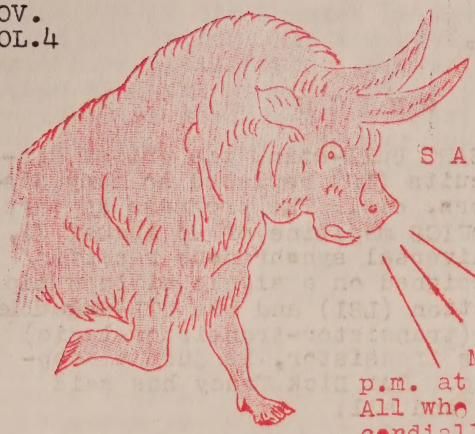
NOV. 1972
VOL.4 NO.1



BULL-ETIN

SAN ANTONIO RADIO CLUB

President - Ivan Mangold WA5RNV
Vice President - Bill Ross K5LLK
Secretary - Mike Fritz WN5HLX
Treasurer - Frank Box WA5VFM
Sgt-at-Arms - Brenda & Linda Trappe

Meets first and third Fridays at 7:30 p.m. at the Red Cross Building, 90 Brees St. All who have an INTEREST in amateur radio are cordially invited to attend.

Bull-etin Editor, Dean Davis W5BGE Typist, Maybelle Davis, XYL

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PREZ SEZ . . . .

By IVAN WA5RNV

I appreciate the Club's confidence in electing me to again serve as your President. After the exceptional job done by Floyd W5JKU, and Bill WA5QHG, during the past two years, coming close to their performance will be nigh impossible.

Your selection of other interested and dedicated officers, directors, committeemen, and volunteers will make the task easier.

To pay the additional costs of planned Club activities, Club Bull-etin, and W5SC Club Stations, your Finance Committee found it necessary to raise dues to $6.00 per year.

A program is planned for the second meeting of each month, covering both technical and general interest subjects. We urge you to attend. If you know of a program available, please contact Bill K5LLK.

Again, I wish to urge the "old timers" to get acquainted with our guests and new members. Go out of your way to make them feel welcome and a part of our club.

Thas all, 73, Ivan WA5RNV.

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25th--HAPPY BIRTHDAY, TRANSISTOR!

(de telephone TALK, Southwestern Bell)

Next month marks the 25th anniversary of an invention that has revolutionized the world.

The transistor.

Conceived at Bell Telephone Laboratories in 1947 this tiny device gave a new look to most electronic appliances.

The transistor opened the door to instant communications almost everywhere by allowing radios to be made pocket size and inexpensive.

Its rugged reliability and compactness have helped solve problems in medicine, computer technology and the exploration of outer space.

And the transistor has enabled us to keep telephone service the best in the world.

So we pay tribute to the scientists--Walter Brattain, John Bardeen and William Shockley-- who won a Nobel Prize in physics for their creation. For its contribution to progress, the transistor has been ranked as one of the most important inventions of the century by the National Inventors Council.

-..- -..-

THE WEST GULF DIVISION WILL HAVE A CONVENTION IN 1973 - APRIL 27,28,29 It will be held in Euless, Texas (about half way between "Big D" and "Cow Town") at the Western Hills Inn; at the junction of Highways 183 and 157, six miles north of SIX FLAGS. Make plans now to attend.

TECHNICAL TOPICS

By W5LFM Cal Graf

In the last issue of the SARC Bull-etin, the writer discussed how integrated circuits (IC) replaced so many discrete transistors, resistors, etc. The progress appears to be unending for ELECTRONICS magazine of 28 August 72, described the building of the first universal synchronous receiver/transmitter for data communications designed on a signle silicon chip. The tencnique uses large scale integration (LSI) and the TTL-compatible chip replaces as many as 30 to 40 TTL (transistor-transistor-logic) IC packages. Maybe the IC, just as the transistor, is just a stop-over for something better to come along. But Dick Tracy has said this all along, what with his wrist TV and all!

There are now audio IC's which will deliver several watts of audio and which require the barest of ingredients such as mike, speaker and battery. It seems that it won't be too long and it will be possible to drape a piece of wire out the window, hook it to a cigarette-sized solid state transmitter and work the world with the little gentlemen.

To show that the above approach is actually closer than you think (if you don't believe in Dick Tracy), ELECTRONIC DESIGN of 12 Oct 72, had an article titled "IC device integrates inductors; Coil-less radio and TV coming." Being developed in Japan, the new semiconductor inductance element is reported to have a Q that ranges from 50 to 100 and can operate at frequencies as high as 10 Mhz. This tenchique has opened up the possibility of fully integrating most circuits that have inductors, except possibly high-voltage ones. The implications of this are significant: It could lead to the production of fully integrated radio and television sets. The Semicon L (semiconductor inductor) combines negative impedance conversion with a gyrator process to produce a temperature stabilized inductance with a high Q. I'll leave the last sentence to be explained and measured by Roy Albright W5EYB, with his Jim-dandy VSWR sniffer.

To further show that the mobile and FM-repeater boys have not been forgotten during the big launch on the small things, I'll describe the Bruton Transform. Filters that separate low-frequency tones in data communication modems (modulator-demodulator) and pushbutton telephone systems normally consist of resistors, capacitors and chunky inductors. While resistors and capacitors are relatively small devices, wire-wound inductors take up valuable space and heavily increase the system's weight. Using a recently developed circuit-theory trick, the Bruton Transform, design engineers now can eleminate inductors entirely by replacing them with resistors. A practical mathematical technique, the Bruton Transform also converts resistors to capacitors and capacitors to frequency dependent negative resistors. (The latter sounds interesting. Wonder what one might do with the cycles per second and Hertz debate? Would we have ohms per second? Instead of the ohm, we would have the ohz, but we'll leave that to the Wizard of Ohz!) A tone-receiver can be designed so that the size of the tone filter is reduced to one-eighth that of previous units. To make Roy Albright's job a bit easier, the gyrator is a negative resistance device containing an operational amplifier. The addition of a capacitor makes the gyrator frequency dependent, conforming to the characteristics of the transformed impedance formula.

A new IC device which is of interestto the antenna or RF circuit design man is a miniature broadband RF power divider/combiner housed in a standard 14 pin DIP (dual in-line plastic) IC package. This new profile divider/combiner is capable of handling 2 watts across the frequency range of 2 to 300 Mhz with a flatness within 0.2 DB. Insertion loss if 0.6 DB. Two watts may not sound like much but look at how much audio they now bang out of a power transistor. And we used to call them low power devices!

The last issue of the SARC Bull-etin discussed the digital meter and how it might soon be in many ham shacks. Well, California Instruments now has a panel meter which you "paste" to your front panel. The 3 and $\frac{1}{2}$ digit panel meter is only $\frac{1}{2}$-inch thick and will sell for about $115. It uses LED displays and requires no more of a panel cutout than is required to get a cable through. The meter is about the size of an audio tape cassette.

We have all seen many exciting things happen in the electronics world

and a recent development in which one can really become a part is the Magic Dot switch. In the past, all switches required movement of some mechanical part. Eventually there was failure. Magic Dot has taken the next step in switch state-of-the-art by offering a totally solid-state device--no movement whatsoever. There are two parts to the switch: a sensor and an output transistor. The face of the switch senses the touch of the finger (via increased capacitance) and turns on the output transistor. The activated switch looks like a saturated transistor in a functional circuit. The total lack of moving parts affords unheard of reliability with a mean time between failure (MTBF) OF HUNDREDS OF MILLIONS OF OPERATIONS. In addition, there is no contact bounce whatsoever.

A recent squid from Opcoa, Inc., makers of LED's states: "From accelerated life tests, many production lots of LED's have been shown to have a typical projected half life of 200,000 hours (23 years) for continuous operation at room temperature." In fact, the useful life of the LED may be considered infinite for most practical applications because the LED life expectancy is typically much longer than the useful life of the equipment in which it is incorporated. Just think--by the time a novice had to replace his LED, he's be a member of the QCWA!! Regards, Cal Graf W5LFM.

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ADD THE FOLLOWING TO THE SAN ANTONIO RADIO CLUB ROSTER:

BALUSEK	Carolyn		8606 Wind Way	78239	653 0869
BOWLES	J. W. Jr.	WB5ETW	603 Storeywood	78213	342 7147
CASE	Bill	W5FNA	3522 Broadway	78209	822 1341
CHASE	Tom	W5KLL	P. O. Box 952	78294	432 8773
EGGLESTON	Lester	WA5GOQ	230 Montpeiler Dr.	78228	734 0698
ESSINGTON	Virginia		Rt. 8, Box 287D	78228	698 2215
HAMRICK	Bill	K5PWX	10411 Auldine	78230	341 4331
HAYS	James	WA5ZCS	624 Alta Ave.	78209	822 9373
WILKERSON	Maidie		3821 Highcliff Dr.	78218	653 5877
WHITAKER	Frank	W5ZI	360 Latch Dr.	78213	733 8941

NEW ADDRESS:

HERSHMAN Boyd WB5OTH/5 1004 Ave. C., Marble Falls, Tex. 78654

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QCWA HOLDS QUARTERLY MEETING

The Quarter Century Wireless Association, San Antonio Chapter, met at the home of Clarence Warner W5HIV in October. Attending were W5s: JKU, KJ, ZI, FKR, HIV, DUI, EOC, EJT, EIS, BGE, K5YOQ and WA5VFM. Henry Henneke, Manager of Semi-Conductors, Physics and Circuits at SwRI presented a talk on Micro-Electronics and showed slides--a very enlightening program! Anyone holding a license for 25 years or more is invited to join the SA Chapter of the QCWA. de Dean W5BGE.

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FOR SALE - HT 37, in excellent condition, $135. Call Sharon WN5GAL at 828 6917.

FOR SALE - SB 220, in mint condition, $375. Call Grady W5VDF at 655 8111.

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S P L A T T E R - Sharon WN5GAL reports that her OM SP/5 Richard A. Naujoks has license HL9VF in Seoul, Korea. He operates on 80, 20& 40 meters mainly at night and afternoons. He will be on 7025 Mhz from now on operating CW, for anyone who wants to work him. If everything goes right, he'll be home sometime around the 26th or 27th of Dec. and then after New Year's they'll leave for Virginia where he'll attend the School of Music at Norfolk.....Brian Ham is now licensed as a "HAM"-WN5IBE!.....Les W5BE is in the process of taking down the first tri-bander from the 98 foot level and put up a four element mono band 20 meter job.....There are 5 candidates for the SCM of South Texas. They are Robert Balusek K5OZF of SA, Ed Campbell K5SBR of Galveston, Joe Cline WA5YPF of Houston, Brian Donohoo W5JVR of Houston and Art Ross W5KR of Brownsville. Ballots will soon be mailed--so VOTE!.....Bill WA5OJC is preparing to hold a tower erection party shortly to replace the one the twister tore up--so BEWARE. 73, Dean W5BGE.

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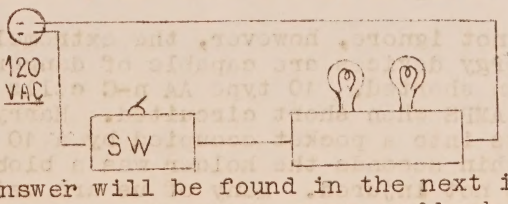
PUZZLE - Here's a black box problem for you: The circuit is shown here. With the switch in one position, one light lights, and with the switch in the other position, the other light lights. Only one wire connects the two boxes. The plug goes into a wall outlet. The switch is SPDT, so what other components may be inside the boxes? Answer will be found in the next issue of BULL-ETIN.



(de IGNITION NOISE, CARS, Lubbock.)

CARE AND USE NICKEL-CADMIUM CELLS

By W5PKK

Little information regarding use and care of N-C cells has reached the amateur. Most of the sketchy info, some published by manufacturers themselves, is conflicting. Thus, general confusion about life, how and when to recharge, etc.

Understanding what occurs inside cells during charge and discharge cycles helps clear up the mysteries.

In its charged state, a cell consists of positive (nickelic hydrexide) and negative (metalic cadmium) electrodes plus electrolyte of potassium hydroxide. Electrical energy is produced by simultaneous oxidation of the negative electrode and reduction of the positive electrode. At discharge, the positive electrode has changed to nickeleous hydroxide and the negative to cadmium hydroxide. Recharging reverses the chemical process. Upon reaching full charge, the positive electrode releases oxygen gas. The negative releases hydrogen gas. Gas release continues thru the rest of the charge cycle. Gases, especially the hydrogen, must be vented out. Otherwise, in a scaled cell, internal pressure will rupture the case. Chemical reversal occurs with little side effect until the latter part of charge cycle and overcharge.

To recharge N-C cells it is necessary to overcharge to insure at least much energy is restored as has been removed during discharge. Even at the recommended charge rate, slight heating occurs. The cell is not 100% efficient so all manufacturers recommend a charge cycle of 140%, the extra 40% being known as "overcharge." Only during the latter part of the overcharge do major side effects occur within the cell.

To make sealed cells which don't leak electrolyte or dangerous gases, manufacturers use a design trick resulting in oxygen recombination. By building extra charge capacity into the negative electrode it never reaches full charge. The positive, at reaching full charge, starts its oxygen release. Construction is such that oxygen is allowed to contact the negative electrode, where it combines with the cadmium. At this point the cell can store no more energy. Continued charge input will oxidize only enough positive electrode to offset the extra charge. Cells are sealed with plastic seals which also insulate the electrodes. Some cases include a resealing vent to protect the seal in case of excessive pressure build up. By following the manufacturer's recommended charge cycle, it is almost impossible to damage seals. Cell chemistry is not boiled away and life expectancy of sealed cells is quite long.

Cell voltage will average 1.2 volts for a major part of the discharge cycle then drop sharply to 1.1 volts at discharge. About the only thing read accurately by a wide scale meter is full charge (abt 1.4V) or full discharge (1.1v or less).

In the reference material available, it was impossible to find support for the theory it is best to discharge to 1.1V before recharging. To the contrary, deep discharge, (below 1.1V) can destroy a cell. Manufacturers recommend recharge before the voltage drops to 1.1V. G. E. recommends recharging any time the cells have less than 100% charge remaining and they say cells can be left on charge at the 14 hour rate for months without damage. Both Eveready and Gould National differ with G. E. saying extended overcharge should be avoided. This seems reasonable. Even with G. E. cells it would be better engineering practice to charge for 14 hours and then remove the charge or reduce it to trickle as soon as possible.

In normal amateur applications current memory is never a problem and can be ignored.

Do not ignore, however, the extremely low impedance. These high energy devices are capable of dangerously high discharge currents when shorted. 10 type AA n-C cells in a pack will discharge at about 20 AMPS when short circuited. Harry Preston W5DOT dropped his car keys into a pocket occupied by a 10 cell holder full of AA cells. Within seconds the holder was a blob of hot plastic. Fortunately he was not injured. Many of us are using these 10 cell holders. If you

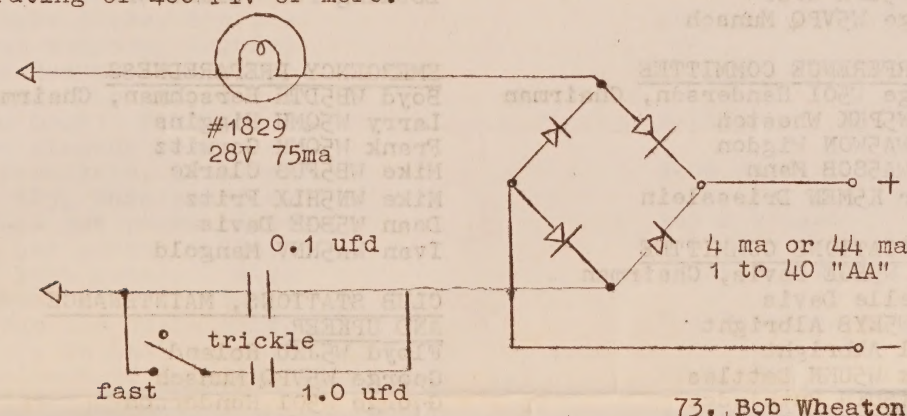
are, obtain a plastic insulated snap battery connector and remove the wires. Use the connector as an insulated cover when carrying the battery pack as a spare.

The Ampere Hour rating marked on most cells is the key to the charge rate. The 14 hour rate is 10% of the AH rating. Trickle rate is 1% of the AH rating. Some manufacturers specify only the 14 hour charge rate on the case of their cells. Approximate AH rating in this case will be 10 times the recommended charge rate. The AH rating is a discharge rating derived over a 10 hour discharge. A 500 MAH (0.5AH) cell will discharge 50 MA. into a load for 10 hours before the voltage drops to 1.1V. It will not discharge 500 MA into a load for 1 hour, but must be derated according to the manufacturer's specs. In the case of the 500 MAH AA type cell, it will discharge at a rate of 500 MA for approximately 50 minutes.

All manufacturers agree that constant current is the best way to charge. Cells should always be charged in series unless current limiting is included for each cell in a parallel setup. Discharged cells should be recharged promptly as they continue to self-discharge and may go into deep discharge or polarity reversal (when used in series). Both canditions can permanently damage cells. At room temperature cells will self-discharge at a rate of approx. 15% each 30 days. In 4 months they will lose almost 70% of their charge. In the event you experience deep discharge or polarity reversal, try first to recharge at the normal 14 hour rate. If they don't bounce back, and they usually will, try fast charging at 10 times the 14 hour rate for a period of 5 minutes, followed by a 20 hour charge at the normal 14 hour rate. If this fails to revive them, discard them and be more careful next time.

The August, 1972 copy of the BULL-ETIN carried an excellent very constant current charger for AA type cells, by Bob Wigton WA5WON.

For those who desire something simpler or more compact, a constant current charger popularized by Bill Hamrick K5PWX appears below. As shown it will trickle or 14 hour charge AA cells at 44 MA. For other charge rates, 1 MFD will give about 40 MA charge. Divide the desired charge rate in MA by 40. The result will be the value of capacity in MFD. Do not use electrolytics! This charger must be properly enclosed as it does constitute a shock hazard. Do not omit bulb as it is both charge indicator and fuse in case of shorted capacitor. Use a capacitor of at least 400WVDC rating. Diodes can be anything with a rating of 400 PIV or more.



73, Bob Wheaton W5PKK.

(ED. NOTE: This article is a condensed version of one soon to be submitted to 73 Magazine.)

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SARO ELECTS NEW OFFICERS

The San Antonio Repeater Organizations, at their Oct. meeting, elected Loren Stroup W5WEU as their new president. Others elected were: Bob Wigton WA5WON, vice pres.; M. D. Harris K5PKX, treasurer; and Corky Sarvis WB5CIT, recording sec. A report on the new repeater regulations was led by Roy Albright W5EYB, West Gulf Director ARRL, and George Munsch W5VPQ, member of the ARRL VHF-FM Advisory Commitee. Plans were made to relicense the SARO repeater with at least 20 control stations.

73, Corky WB5CIT.

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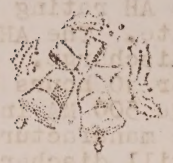
FOR SALE--General Coverage Receiver, Hallicrafters SX 110, $50. Call Chuck Kenworthy WB5FWI at 342 4541.

The following Club Members were elected to serve, during the coming year, October 1,1972 thru September 30, 1973

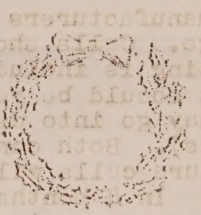


OFFICERS - EXECUTIVE COMMITTEE

PRES. Ivan WA5RNV Mangold
V-P. Bill K5LLK Ross
SEC. Mike WN5HLX Fritz
TREAS. Frank WA5VFM Box

DIRECTORS-OPERATIONS COMMITTEE

Bill WA5QHG Way, Chairman
Ivan WA5RNV Mangold
Bill K5LLK Ross
Mike WN5HLX Fritz
Frank WA5VFM Box
Dean W5BGE Davis
Chuck W5UKN Settles
Bill K5TSR Parry
Jim K5UKN Rutledge
Albert WA5IBD Trappe



In accordance with the Constitution and By-Laws, the following Committee appointments were made by the President.

FINANCE COMMITTEE
Bill K5TSR Parry, Chairman
Floyd W5JKU Roland
Ray W5HBI Davis
Les W5BE Essington
Frank WA5VFM Box

MEMBERSHIP COMMITTEE
Bill K5LLK Ross, Chairman
Homer K5MEN Driesslein
Bill WA5QHG Way

PROGRAM COMMITTEE
Bill K5LLK Ross, Chairman
Cal W5LFM Graf
George W5VPQ Munsch

INTERFERENCE COMMITTEE
George W5OI Henderson, Chairman
Bob W5PKK Wheaton
Bob WA5WON Wigdon
Tom WA5SCB Mann
Homer K5MEN Driesslein

PUBLICATIONS COMMITTEE
Dean W5BGE Davis, Chairman
Maybelle Davis
Roy W5EYB Albright
Hazel Albright
Chuck W5UKN Settles
Jim K5UKN Ruthledge
Bob K5OZF Balusek

PUBLICITY & PUBLIC RELATIONS
Mike WB5FUS Clarke
Dave WB5GDL Reed
Corky WB5CIT Sarvis
Jane WA5EZJ Pinkerton
Mike WN5HLX Fritz

REFRESHMENTS
Albert WA5IBD Trappe
Linda Trappe
Brenda Trappe
Bill WA5QHG Way
Gladys Way

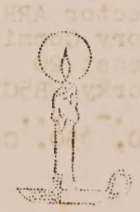
XMAS PARTY
Dean W5BGE Davis, Chairman
Maybelle Davis
Volunteers

FIELD DAY
Bill K5TSR Parry, Chairman
Looking for Volunteers

EMERGENCY PREPAREDNESS
Boyd WB5DTH Herschman, Chairman
Larry W5QMU Higgins
Frank W5QMH Gerwitz
Mike WB5FUS Clarke
Mike WN5HLX Fritz
Dean W5BGE Davis
Ivan WA5RNV Mangold

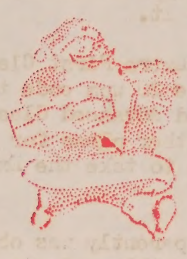
CLUB STATIONS, MAINTENANCE AND UPKEEP
Floyd W5JKU Roland
George W5VPQ Munsch
George W5OI Henderson
Leonard K5IEG Ohmes
Boyd WB5DTH Herschman
Ivan WA5RNV Mangold

CODE & THEORY CLASSES
Otto WA5UYE Schneider, Chairman
Homer K5MEN Driesslein
Larry WB5CNX Williams
Allan W5UPO Wilkerson



CHRISTMAS DANCE DINNER

CQ ALL SAN ANTONIO-AREA RADIO AMATEURS!! The San Antonio Radio Club Annual Christmas Dinner - Dance will be Saturday, December 9 at Strange's Party House. 1513 Bandera Road. All Amateurs and their XYL's/YL's or OM's are invited to attend this gala event!



Social hour will be from 6 to 7 p.m. Set-ups will be furnished, so BYOB Chips and dips will be served at this time, and during the dance. Dinner will be at 7 p.m. Don Strange has promised us a real Christmas dinner with all the trimmings! You will have a choice of turkey and dressing, three other meats--(all, if you desire)-the usual excellent dinner they are well known for: Always plenty to eat Dancing will be from 9 till 1 p.m. Music will be played by the popular area group, "Larry and the Premiers". Wear your dancing shoes and be prepared to "trip the light fantastic!" Or maybe it might TRIP you!!

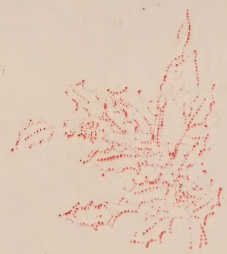
Last year there were more than 100 happy People there, some from Houston, Seguin, New Braunfels, Austin, Corpus Christi, and Van Ormy!! Tickets are already going at a fast rate. Limited to 125, this year -- so-o- get yours now! $6 per person - (Same as last year). High school members & their dates are half- price (same as last year!) Chairman of Arrangements - Dean Davis

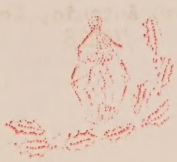
DEC. 9

YOU CAN

GET YOUR TICKETS FROM:

Ivan Mangold	WA5RNV 826 6515
Bill Way	WA5QHG 433 5154
Gene Jank	W5EJT 342 2225
Roy Albright	W5EYB 822 7269
Frances Bruemmer	W5KQG 344 5134
Bob Wheaton	W5PKK 695 8430
Frank Box	WA5VFM 734 5893
Dean Davis	W5BGE 735 1622
Frank Gerwitz	W5QMH 734 5598





S. A. Radio Club

ARRL NEWS TO ALL AMATEURS FROM THE DIRECTOR, WEST GULF DIVISION

Recent months have seen a flurry of orders from the Federal Communications Commission making significant changes in amateur radio operation rules, regulations and operating frequencies. Each of us has the responsibility to study the new rules very carefully in order not to be found in violation.

Unfortunately, in some portions of the new rules it is difficult to understand exactly what the FCC expects from us. The League is working with the Commission in an effort to clarify the ambiguous points.

There were three major orders issued: One is the report and order pertaining to docket 18803 - called Repeater Rules. Another is docket 19162 - Fone Band changes. The third concerns handling third party traffic (docket 19245).

October QST contains the new Repeater rules. However - ALL amateurs, regardless of whether or not they use repeaters, are affected by some portions of this order.

November QST contains the Fone Band Expansion changes. Incidentally there is a minor error. In the right hand column of the table on p. 79, Advanced & Extra, 21,250 - 21,270 should read 21,270 - 21,350.

December QST will contain the new rules pertaining to the type of messages we can handle. This is a biggie for traffic nets. Watch for it.

Other Actions: Those old timers who held the old Amateur Extra First Class ticket in the 20's and early 30's will not have to take the 20 wpm code test for the current Extra Class license provided they have held Advanced Class license continuously since that time. The Commission denied all other pleas for what is called 'grandfathering' to Extra Class. The two year wait to take the Extra exam has been reduced to one year.

In the 'how stupid can we get' category, the Commission apparently was obligated by the environmentalists to call for comments regarding possible rules requiring elaborate studies and statements on license applications on conceivable effect of antenna poles and towers on the environment! If carried to the foreseeable extreme, this could have the effect of requiring years on end to get a station license, and expenditure of large sums of money on technical studies and lawyer fees! The League, as an interim measure has commented to the Commission we consider this none of our business. Maybe so.

* * * * * * * * *

We learned, with considerable regret, that South Texas SCM Lee Ulrey, K5HZR, will not be a candidate for re-election. Lee has been a dedicated, hard-working SCM who will be difficult to replace.

* * * * * * * *

Planning for the West Gulf Division ARRL 1973 Convention, to be held between Dallas and Fort Worth, is coming along nicely. This could well be one of the best we've had in this Division. It is sincerely hoped the attendance from San Antonio will be real big. We're about due for another one down here.

* * * * * * * *

73, Hope to see all of you at the San Antonio Radio Club Christmas Party.

ROY L. AIRRIGHT, W5EYB, DIRECTOR, WEST GULF DIVISION ARRL.

San Antonio Radio Club
P. O. Box 62
San Antonio, Texas
78218

George Munsch W5VPQ
Ella Munsch W5TSE
11314 Janet Lee
San Antonio Tx 78230